

CLAIMS

What is claimed is:

1. An isolated nucleic acid comprising a polynucleotide sequence that encodes a non-human primate Fc receptor polypeptide with an amino acid sequence of SEQ ID NO: 9, SEQ ID NO: 11, SEQ ID NO: 15, SEQ ID NO: 17, SEQ ID NO: 18, SEQ ID NO: 20, SEQ ID NO: 25, SEQ ID NO: 29, SEQ ID NO: 64 or fragments thereof.
2. An isolated nucleic acid of claim 1, wherein the polynucleotide sequence has a sequence of SEQ ID NO: 1.
3. An isolated nucleic acid of claim 1, wherein the polynucleotide sequence has a sequence of SEQ ID NO: 3.
4. An isolated nucleic acid of claim 1, wherein the polynucleotide sequence has a sequence of SEQ ID NO: 5.
5. An isolated nucleic acid of claim 1, wherein the polynucleotide sequence has a sequence of SEQ ID NO: 7.
6. An isolated nucleic acid of claim 1, wherein the polynucleotide sequence has a sequence of SEQ ID NO: 13.
7. An isolated nucleic acid of claim 1, wherein the polynucleotide sequence has a sequence of SEQ ID NO: 22.
8. An isolated nucleic acid of claim 1, wherein the polynucleotide has a sequence of SEQ ID NO: 23.
9. An isolated nucleic acid of claim 1, wherein the polynucleotide has a sequence of SEQ ID NO: 27.

10. A method for obtaining a nucleic acid sequence encoding an Fc receptor polypeptide comprising:

 a) amplifying a nucleic acid from a nonhuman primate cell with a primer set comprising a forward and a reverse primer, wherein the primer sets are selected from the group consisting of SEQ ID NO:31 and SEQ ID NO:32, SEQ ID NO:33 and SEQ ID NO:34, SEQ ID NO:35 and SEQ ID NO:36, SEQ ID NO:37 and SEQ ID NO:38, SEQ ID NO:39 and SEQ ID NO:40, SEQ ID NO:41 and SEQ ID NO:42, SEQ ID NO:43 and SEQ ID NO:44, SEQ ID NO:45 and SEQ ID NO:46, SEQ ID NO:47 and SEQ ID NO:48, SEQ ID NO:49 and SEQ ID NO:50, SEQ ID NO:51 and SEQ ID NO:52, and SEQ ID NO:53 and SEQ ID NO:54;

 b) isolating the amplified nucleic acid.

11. An isolated nucleic acid prepared according to the method of claim 10.

12. A method according to claim 10, wherein the nonhuman primate cell is a spleen cell.

13. A method according to claim 10, wherein the nonhuman primate cell is a cynomologus cell or a chimp cell.

14. An isolated nucleic acid of claim 1, wherein the polynucleotide encodes an extracellular fragment of the Fc receptor polypeptide.

15. A vector comprising a nucleic acid of claim 1.

16. A host cell comprising a vector of claim 15.

17. A host according to claim 16, wherein the cell is a mammalian cell.

18. A nucleic acid of claim 1, further comprising a polypeptide nucleotide sequence encoding a heterologous polypeptide operably linked to the nucleotide sequence encoding a Fc receptor polypeptide.

19. A nucleic acid according to claim 18, wherein the heterologous polypeptide provides for purification of the Fc receptor polypeptide.

20. A nucleic acid according to claim 19, wherein the heterologous polypeptide is selected from the group consisting of Gly/His₆ fused to glutathione S-transferase, 6-His tag, thioredoxin tag, hemagglutinin tag, Glylh156 tag, and OmpA signal sequence tag.

21. An isolated polypeptide comprising an amino acid sequence of SEQ ID NO: 9 or SEQ ID NO: 65, or fragment thereof.

22. An isolated polypeptide comprising an amino acid sequence of SEQ ID NO: 15 or SEQ ID NO: 66, or fragment thereof.

23. An isolated polypeptide comprising an amino acid of SEQ ID NO: 17 or SEQ ID NO: 67, or fragment thereof.

24. An isolated polypeptide comprising an amino acid sequence of SEQ ID NO: 18 or SEQ ID NO: 68, or fragment thereof.

25. An isolated polypeptide comprising an amino acid sequence of SEQ ID NO: 20 or SEQ ID NO: 69, or fragment thereof.

26. An isolated polypeptide comprising an amino acid sequence of SEQ ID NO: 29 or SEQ ID NO: 64, or SEQ ID NO: 71, or SEQ ID NO: 72, or fragment thereof.

27. An isolated polypeptide comprising an amino acid sequence of SEQ ID NO: 25 or SEQ ID NO: 70.

28. An isolated polypeptide comprising an amino acid sequence of SEQ ID NO: 11.
29. An isolated fusion protein comprising a heterologous polypeptide joined to a Fc receptor polypeptide fragment having an aminoacid sequence of $\Delta 1$ to $\Delta 269$ of SEQ ID NO:65.
30. An isolated fusion protein comprising a heterologous polypeptide joined to a Fc receptor polypeptide fragment having an aminoacid sequence of $\Delta 1$ to $\Delta 182$ of SEQ ID NO:66.
31. An isolated fusion protein comprising a heterologous polypeptide joined to a Fc receptor polypeptide fragment having an aminoacid sequence of $\Delta 1$ to $\Delta 184$ of SEQ ID NO:68.
32. An isolated fusion protein comprising a heterologous polypeptide joined to a Fc receptor polypeptide fragment having an aminoacid sequence of $\Delta 1$ to $\Delta 187$ of SEQ ID NO:69.
33. An isolated fusion protein comprising a heterologous polypeptide joined to a Fc receptor polypeptide fragment having an aminoacid sequence of $\Delta 1$ to $\Delta 274$ of SEQ ID NO:71 or SEQ ID NO:72.
34. An isolated fusion polypeptide according to claim 29, wherein the heterologous polypeptide is a gly/his6-gst tag..
35. An isolated fusion polypeptide comprising a heterologous polypeptide joined to a Fc receptor polypeptide of claim 27.
36. An isolated fusion polypeptide comprising a heterologous polypeptide joined to a Fc receptor polypeptide of claim 28.

37. An isolated polypeptide variant having an amino acid sequence having at least 95% sequence identity with the amino acid sequence of SEQ ID NO: 9.

38. An isolated polypeptide variant having an amino acid sequence having at least 90% sequence identity with the amino acid sequence of SEQ ID NO: 15.

39. An isolated polypeptide variant having an amino acid sequence having at least 98% sequence identity with the amino acid sequence of SEQ ID NO: 17.

40. An isolated polypeptide variant having an amino acid sequence having at least 92% sequence identity with the amino acid sequence of SEQ ID NO: 18.

41. An isolated polypeptide variant having an amino acid sequence having at least 92% sequence identity with the amino acid sequence of SEQ ID NO: 20.

42. An isolated polypeptide variant having an amino acid sequence having at least 93% sequence identity with the amino acid sequence of SEQ ID NO: 25.

43. An isolated polypeptide variant having an amino acid sequence having at least 97% sequence identity with the amino acid sequence of SEQ ID NO: 29.

44. A method for evaluating at least one biological property of an Fc region containing molecule comprising:

- contacting an isolated non-human primate Fc receptor polypeptide with an Fc region containing molecule; and
- determining the effect of the contact on at least one biological property of the Fc region containing molecule.

45. A method according to claim 44, wherein the Fc region containing molecule is an antibody.

46. A method according to claim 45, wherein the antibody is a humanized antibody.

47. A method according to claim 46, wherein the antibody is an antibody variant.

48. A method according to claim 47, wherein the non-human primate Fc receptor polypeptide is a soluble receptor.

49. A method according to claim 48, wherein the non-human primate receptor polypeptide is selected from the group consisting of Fc γ RI α -chain, Fc γ RIIA, Fc γ RIIB, Fc γ RIIIA α -chain, FcRn α -chain and mixtures thereof.

50. A method according to claim 44, wherein the non-human primate receptor polypeptide is expressed on a cell.

51. A method according to claim 44, wherein the biological property is the binding affinity of the Fc region containing molecule for the non-human primate receptor polypeptide.

52. A method according to claim 44, wherein the biological property is the toxicity of the Fc region containing molecule.

53. A method according to claim 44, wherein the isolated non-human primate Fc receptor polypeptide is a FcRn α -chain and the biological property is the half-life of the Fc region containing molecule.

54. A method according to claim 44, wherein the non-human primate Fc receptor polypeptide comprises an amino sequence of 1 to 265 of SEQ ID NO: 65.

55. A method according to claim 44, wherein the non-human primate Fc receptor polypeptide comprises an amino acid sequence of 1 to 172 of SEQ ID NO: 66.

56. A method according to claim 44, wherein the non-human primate Fc receptor polypeptide comprises an amino acid sequence of 1 to 174 of SEQ ID NO: 68.

57. A method according to claim 47, wherein the non-human primate receptor polypeptide comprises an amino acid sequence of amino acids 1 to 172 of SEQ ID NO: 69.

58. A method according to claim 44, wherein the non-human primate Fc receptor polypeptide comprises an amino acid sequence of amino acids 1 to 171 of SEQ ID NO: 67.

59. A method for evaluating at least one biological property of an Fc region containing molecule comprising:

- a) contacting a Fc region containing molecule with a cell transformed with an isolated nucleic acid according to claim 1; and
- b) determining the effect of the contact on at least one biological property of the Fc region containing molecule.

60. A method according to claim 59, wherein the Fc region containing molecule is an antibody or antibody variant.

61. A method according to claim 59, wherein the biological property is the binding affinity of the Fc region containing molecule for the non-human primate Fc receptor polypeptide.

62. A method according to claim 59, wherein the cell is transformed with at least two nucleic acids according to claim 1.

63. A method according to claim 62, wherein the nucleic acids comprise a nucleic acid that encodes a cynomolgus Fc γ RI α -chain of SEQ ID NO: 9 and a nucleic acid that encodes a cynomolgus Fc γ R gamma chain of SEQ ID NO: 11.

64. A method according to claim 62, wherein the nucleic acids comprise a nucleic acid that encodes a cynomolgus Fc γ RIII α -chain of SEQ ID NO: 20 and a nucleic acid that encodes a cynomolgus Fc γ R gamma chain of SEQ ID NO: 11.

65. A method according to claim 62, wherein the nucleic acids comprise a nucleic acid that encodes a cynomolgus Fc γ R α -chain of SEQ ID NO: 29 and a nucleic acid sequence that encodes a cynomolgus β -2 microglobulin of SEQ ID NO: 25.

66. A method for identifying an agent that has an increased affinity for at least one cynomolgus Fc receptor polypeptide with an ITAM region compared to human Fc receptor polypeptide comprising:

- a) determining the binding affinity of the agent to at least one cynomolgus Fc receptor polypeptide associated a polypeptide with an ITAM region;
- b) determining the binding affinity of the agent to the corresponding human Fc receptor polypeptide; and
- c) selecting agents that have an increased affinity for the cynomolgus Fc receptor polypeptide associated with a polypeptide with an ITAM region compared to the corresponding human Fc receptor.

67. A method according to claim 66, wherein the agent is an antibody.

68. A method according to claim 67, wherein the agent is an IgG antibody.

69. A method according to claim 67, wherein the Fc receptor polypeptide is selected from the group consisting of Fc γ R1 α -chain, Fc γ RIIA, Fc γ RIIIA α -chain and mixtures thereof.

70. A method for identifying an agent that has an altered affinity for a cynomolgus Fc receptor polypeptide with an ITIM region compared to corresponding human Fc receptor polypeptide comprising:

- a) determining a binding affinity for the agent to be at least one cynomolgus Fc γ RIIB receptor polypeptide;
- b) determining a binding affinity of the agent to corresponding human Fc γ RIIB receptor polypeptide; and
- c) selecting agents with altered affinity for a cynomolgus Fc γ RIIB receptor polypeptide with an ITIM region compared to corresponding human Fc γ RIIB polypeptide.

71. A method according to claim 70, wherein the agent is an antibody.

72. A method for identifying an agent with increased binding affinity for a cynomolgus Fc receptor polypeptide with an ITAM region and decreased affinity for a cynomolgus Fc receptor polypeptide with an ITIM region comprising:

- a) determining a binding affinity of the agent for at least one cynomolgus Fc receptor polypeptide associated with an ITAM region and a binding affinity of the agent to the corresponding human Fc receptor polypeptide;
- b) determining the binding affinity of the agent for at least one cynomolgus Fc receptor polypeptide with an ITIM region and a binding affinity of the agent for the corresponding human Fc receptor polypeptide; and
- c) selecting an agent with enhanced binding for a cynomolgus Fc receptor polypeptide with an ITAM region and a decreased affinity for a cynomolgus Fc receptor polypeptide with an ITIM region compared to the corresponding human Fc receptor polypeptides.

73. A method according to claim 72, wherein the Fc γ receptor with an ITAM region is an Fc γ receptor IIA and the Fc γ receptor with an ITIM region is a Fc γ receptor IIB.

74. A method according to claim 73, wherein the agent is an antibody.

75. An isolated nucleic acid comprising a polynucleotide sequence that encodes a non-human primate Fc receptor polypeptide with an amino acid sequence of SEQ ID NO: 65, SEQ ID NO: 66, SEQ ID NO: 67, SEQ ID NO: 68, SEQ ID NO: 69, SEQ ID NO: 70, SEQ ID NO: 71, SEQ ID NO: 72 or fragments thereof.

76. An isolated nucleic acid of claim 75, wherein the polynucleotide sequence has a sequence of SEQ ID NO: 1.

77. An isolated nucleic acid of claim 75, wherein the polynucleotide sequence has a sequence of SEQ ID NO: 3.

78. An isolated nucleic acid of claim 75, wherein the polynucleotide sequence has a sequence of SEQ ID NO: 5.

79. An isolated nucleic acid of claim 75, wherein the polynucleotide sequence has a sequence of SEQ ID NO: 7.

80. An isolated nucleic acid of claim 75, wherein the polynucleotide sequence has a sequence of SEQ ID NO: 13.

81. An isolated nucleic acid of claim 75, wherein the polynucleotide sequence has a sequence of SEQ ID NO: 22.

82. An isolated nucleic acid of claim 75, wherein the polynucleotide has a sequence of SEQ ID NO: 23.

83. An isolated nucleic acid of claim 75, wherein the polynucleotide has a sequence of SEQ ID NO: 27.

84. A vector comprising a nucleic acid of claim 75.

85. A host cell comprising a vector of claim 84.

86. A host according to claim 85, wherein the cell is a mammalian cell.

87. A nucleic acid of claim 75, further comprising a polypeptide nucleotide sequence encoding a heterologous polypeptide operably linked to the nucleotide sequence encoding a Fc receptor polypeptide.

88. A nucleic acid according to claim 87, wherein the heterologous polypeptide provides for purification of the Fc receptor polypeptide.

89. A nucleic acid according to claim 88, wherein the heterologous polypeptide is selected from the group consisting of Gly/His₆ fused to glutathione S-transferase, 6-His tag, thioredoxin tag, hemagglutinin tag, Glylh156 tag, and OmpA signal sequence tag.

90. An isolated nucleic acid of claim 1, wherein the Fc receptor polypeptide has an amino acid sequence of amino acid residues of 1 to 274 of SEQ ID NO: 71 or SEQ ID NO:72.